

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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| In the Matter of |) | |
| |) | GEN Docket No. 90-314 |
| Amendment of the Commission's Rules to |) | |
| Establish New Personal Communications |) | |
| Services |) | |

**REPLY TO OPPOSITIONS TO
OMNIPONT'S PETITION FOR RECONSIDERATION**

Omnipoint Corporation ("Omnipoint"), by its attorneys and pursuant to Section 1.429 of the Commission's rules, files this Reply to the oppositions and other comments filed concerning Omnipoint's July 25, 1994 Petition for Reconsideration of the Memorandum Opinion and Order in the above-referenced docket.¹

Introduction and Executive Summary

Omnipoint, as a PCS service provider and equipment manufacturer, in its Petition for Reconsideration, addressed two topics. First, regarding the Unlicensed PCS rules, Omnipoint requested that the Commission extend the minimum LBT time to 20 milliseconds² and extend the allowable Frame Period to 20 milliseconds/X, where X is a whole number.³ Second, regarding the Licensed PCS rules, Omnipoint noted that the existing Out of Band emission rules have the unintended consequence of eliminating all PCS technologies from the 10 MHz licenses.

¹ Memorandum Opinion and Order, GEN Docket No. 90-314, FCC 94-144 (released June 13, 1994) ("M O & O"). On June 24, 1994, the M O & O was published in the Federal Register. 59 F.R. 32830 (June 24, 1994).

² Omnipoint Petition for Reconsideration, at 4.

³ Omnipoint Petition for Reconsideration, at 3.

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Since the rule must be modified, Omnipoint recommended that the Commission adopt a 1% resolution measurement bandwidth and an Out of Band emission spectrum mask similar to the Unlicensed PCS rules, thus leading to improved interoperability and consistent measurement techniques.

Comments on Omnipoint's Petition for Reconsideration

Omnipoint believes that three Comment responses were applicable to its Petition for Reconsideration. Motorola, Celeritek and MCI responded to the Licensed topic and Motorola also included, in its Comments, the Unlicensed topic.

Regarding the need to specify an Out of Band emission mask that is usable, Motorola agrees with many of the arguments presented by Omnipoint, especially the support for reducing the resolution bandwidth of measurement devices.⁴ Celeritek, a prominent Gallium Arsenide semiconductor manufacturer, also strongly supported an improved Out of Band emissions rule as detailed in the Omnipoint Petition, recognizing that constant envelope modulation schemes are the basis for many leading edge wireless technologies.⁵

No vendor of PCS equipment opposed Omnipoint's recommendation on how to measure Out of Band and Spurious Emissions. However, MCI indicated concern that Omnipoint's proposal needed more study. Omnipoint does not believe the industry can wait to have this rule clarified at some later date because no PCS technology can pass the existing rule for the 10 MHz licenses. Instead, Omnipoint proposes a modification to its rule that directly addresses MCI's concern.

⁴ Comments of Motorola, at 14.

⁵ Comments In Support of Omnipoint's Petition for Reconsideration (filed August 29, 1994).

Omnipoint disagrees with the Motorola premise for opposing the Omnipoint proposal to increase the LBT time and the Frame Period in the Unlicensed rules.

Licensed Out of Band Emissions

Omnipoint's Petition for Reconsideration proposed an Out of Band emission rule that, in the oppositions and comments, received support from Motorola and Celeritek for the 1% resolution bandwidth measurement and the concept of a spectrum mask, similar to the Unlicensed rules. MCI stated their concerns with the proposed text for the Out of Band rule, but it also indicated that under a specific set of operating conditions, Omnipoint might be granted a waiver to utilize the proposed Out of Band emission text. Omnipoint disagrees with the MCI conclusions. However, Omnipoint appreciates the concerns expressed by MCI and proposes a modification that directly addresses their concern.

In its comments, MCI did not offer to provide a technical solution to their stated concerns regarding Omnipoint's proposed rules. Instead, MCI recommended additional study.⁶ The problem is that the existing rule is unworkable by any PCS technology within the 5 MHz bands associated with the 10 MHz licenses. Thus, neither the industry nor the FCC can afford to delay a decision on these issues. Some workable rule must be put in place.

MCI mistakenly assumes Omnipoint's proposal was geared toward wideband technologies. Omnipoint's proposal attempted to enable all PCS technologies by including a realistic spectrum mask and a realistic resolution bandwidth measurement. It is important to note that five of the seven technologies that are still proposed in the Joint Technical Committee (JTC) for mobile PCS are "wideband." But, defining an emission mask that is realistic for vendors to meet yet fair to all service providers is just as critical for "narrowband" technologies. This

⁶ MCI Comments, at 4 (filed August 30, 1994).

problem is especially acute when comparing the interference potential of many narrowband channels on simultaneously within a 5 MHz allocation.

In the Motorola and Celeritek comments, it was clearly expressed that they recognize the technical merit of the points made in Omnipoint's Petition. With the above mentioned support and concerns noted, Omnipoint proposes a modification to its earlier proposal which uses a linearly declining mask which drops off sharply.

Specifically, Omnipoint recommends that the Commission adopt the following compromise text for Part 24.238 Emission Limits for Licensed PCS devices:

24.238 Emission Limits

(a) The fundamental emission of the transmitter shall be located as close to the edge of the Licensed band as the transmitter is designed to operate. This is designated as B/2, or one half the Channel Bandwidth, B, for this subpart. The Emission Bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency, and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the Out of Band Emission Limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the Emission Bandwidth of the device under measurement. Out of Band Emissions shall be attenuated below an unmodulated carrier power as follows: 30 dB at the channel edges linearly decreasing to 50dB at 1B above or below the channel; 50 dB at 1B above or below the channel linearly decreasing to 60 dB at 2B above or below the channel edges; or $43 + 10\log_{10}(P)$ decibels, or 80 decibels, whichever is the lesser attenuation.

Spurious Emissions outside a licensee frequency block shall be attenuated below the transmitter power in Watts (P) by at least 43 plus $10\log_{10}(P)$ decibels, or 80 decibels, whichever is the lesser attenuation. Compliance with the Spurious Emissions Limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

Where emissions within the licensee frequency block influence the levels measured outside the block sufficiently to show non-compliance, alternative techniques may be used provided the technique is coordinated with the Commission.

NOTE: The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

Unlicensed LBT and Frame Period

Only Motorola commented on the Unlicensed topic of an extended LBT and Frame Period. The Motorola position includes several comments.

First, Motorola states: "Increasing this value to 20 milliseconds penalizes more narrowband technologies because many frequency windows must be monitored for the longer period. This will adversely impact spectrum access times and battery life of portable devices."⁷ Omnipoint is concerned with the Motorola philosophy that intermixes technology fundamentals with specific deployment choices. The additional delay of one hundredth of a second occurs only when initially accessing the spectrum. From a technological perspective, this delay is absolutely insignificant. Thus, Motorola's point of opposition can only arise if a specific deployment implementation of a narrowband Unlicensed technology creates significant delays. Claims that increasing Frame Period, and hence LBT times, to 20 milliseconds from 10 milliseconds will greatly and adversely affect the time required to find an open frequency slot and battery life are fallacious. As a realistic example, the attached Figure 1 shows the access times for a system with 40 possible 100 kHz wide channels. Even assuming no intelligence to the search algorithm, a Monte Carlo simulation proves that the increase in access time is tiny,

⁷ Comments of Motorola, at 13 (filed August 30, 1994).

even when the system is nearing capacity. Thus, there is virtually no penalty associated with increasing LBT to 20 milliseconds from 10 milliseconds.

Omnipoint believes that any specific implementation which somehow multiplies the actual minuscule delay into a significant delay could be fixed with changes to that vendor's algorithm. Any narrowband vendor which has a problem could rewrite their algorithms to eliminate any "excess" delay. Fair use of the new Unlicensed band requires compromises by all vendors. Thus far, only wideband technologies have had to bear all of the cost of redesigning their technologies to fit into the new Unlicensed band rules.

The purpose of the LBT and frame period times is not to block time and spectrum window access, but to prevent interference and collisions and to provide access.

We note that neither Motorola, nor anyone else for that matter, has created a record in their filings, or any proof, that supports their "delay" arguments in opposition to allow up to a 20 millisecond Frame Period. In contrast, the proposed 20 millisecond LBT and Frame Period were presented with very specific reasons for the request to extend technologies into the Unlicensed band allocation. No vendor has to use a 20 millisecond Frame Period if they prefer 10 milliseconds. Thus every technology that worked under the old rule will continue to work. The only opposition to the 20 millisecond LBT is a vague statement that an occasional one hundredth of a second increase in initial access time to a channel disadvantages narrowband technologies. This is not a detailed enough explanation for any party to be able to comment on the validity of this claim.

Omnipoint, as a wideband technology, has made extreme compromises, including engineering redesign to accommodate the new 1.25 MHz channelization requirement of the unlicensed band.⁸ The original 10 millisecond values for LBT and Frame Period are not sacred.

⁸ 47 C.F.R. § 15.323 (a).

We urge the Commission to recognize the tremendous effort Omnipoint has made to interoperate between Licensed and Unlicensed deployments and to require the responsibility of compromise to fall, this time, on other expected Unlicensed Band participants.

In addition, Motorola states: "Indeed, the vocoder speech analysis interval need not be the same as the frame period of the air interface transmissions."⁹ Omnipoint vocoder experts strongly disagree with this Motorola statement. A brief explanation of advanced vocoder theory, including the concept of frame alignment with the speech coder analysis interval, is necessary. This alignment reduces the number of lost frames when a channel error occurs by half. A non-aligned system generates a "snowball effect" when channel errors are encountered and more frames are lost due to the initial error. Also, the pattern matching techniques of voice and stored waveforms are dependent on compression schemes. These compression schemes take full advantage of voice redundancy and offer greatly improved voice quality using low bit rate and 20 millisecond frame periods. These 20 millisecond frame periods are currently required by many of these vocoders in order to offer wireline quality.

Conclusion

Omnipoint, in its Petition for Reconsideration, proposed Licensed Out of Band emission rules that were supported by other vendors in the PCS industry. No equipment vendor opposed Omnipoint's proposal, only MCI raised a concern. Omnipoint, in an effort to accomplish consensus, has addressed the MCI concerns by modifying its proposed Out of Band emission rule in these Reply comments.

Omnipoint's Unlicensed proposal to modify the LBT time and the Frame Period to 20 milliseconds was opposed only by Motorola. The purpose of the LBT and frame period times is not to block time and spectrum window access, but to prevent interference and collisions and to

⁹ Comments of Motorola, at 13.

allow full access by a wide range of technologies. The additional delay introduced in only initial access time is minuscule and the objections are not really technical in nature but rather due to specific deployment choices. Omnipoint has countered the opposing arguments with technical facts and reasoning and strongly urges the Commission to accept Omnipoint's Petition for Reconsideration.

Respectfully submitted,

OMNIPPOINT CORPORATION

A handwritten signature in dark ink, appearing to read "Mark J. O'Connor", is written over a horizontal line.

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Date: September 9, 1994

Time to Find Unused Frequency Slot is Minimally Impacted
By Increasing LBT Time from 10 msec to 20 msec.
20 msec Frame Time is OK

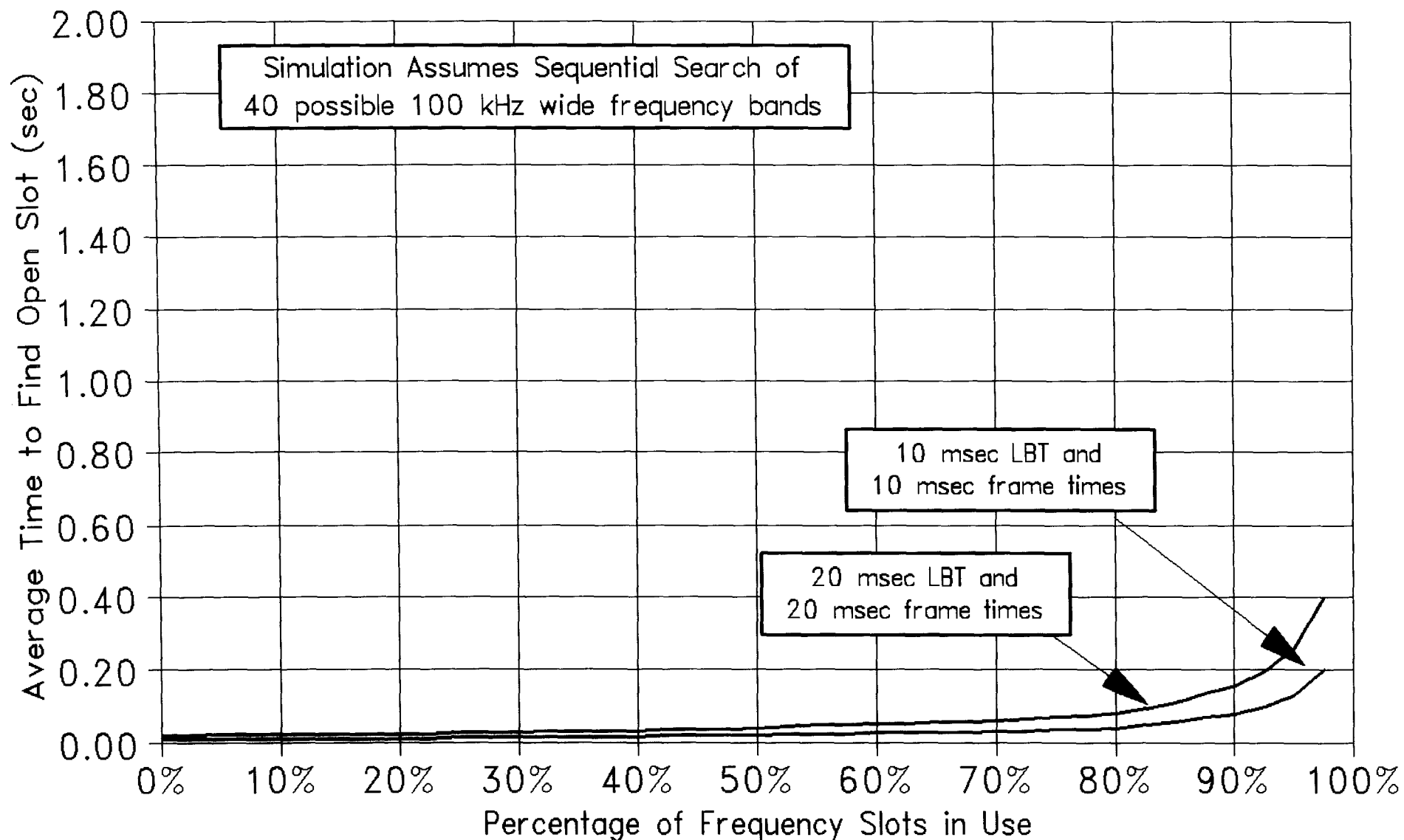


FIGURE 1

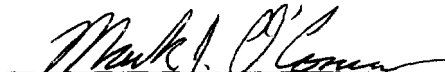
CERTIFICATE OF SERVICE

I, Mark J. O'Connor, hereby certify that on this 9th day of September, 1994, a copy of the attached "Reply To Oppositions To Omnipoint's Petition For Reconsideration" was served on the following parties via first-class U.S. mail, postage prepaid:

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